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**DIGITAL FLOOD INSURANCE RATE MAPS AND THEIR INFLUENCE ON
CAMERON PARISH, LOUISIANA, POST-HURRICANE RITA**

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**DIGITAL FLOOD INSURANCE RATE MAPS AND THEIR INFLUENCE ON
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by

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Report

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Dedication

To my boyfriend, Todd

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Abstract

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The University of Texas at Austin, 2009

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Cameron Parish, Louisiana, was impacted by one of the most devastating hurricane seasons in U.S. history in 2005. Three weeks after Hurricane Katrina hit New Orleans, Hurricane Rita stormed over the Texas-Louisiana border delivering another debilitating blow to the Louisiana coast and creating devastation along the southwestern coastline. In March 2008, the Federal Emergency Management Agency (FEMA) updated the Flood Insurance Rate Maps (FIRMs) for Cameron Parish. These maps rezoned much of Cameron Parish by placing a majority of the parish's land in a flood zone rating of V or higher. FEMA's reluctance to provide federal disaster funds to substantially redevelop and newly construct buildings in areas classified as a flood zone rating of V or higher makes it difficult for Cameron Parish to redevelop as they desperately need federal assistance. This research analyzes Cameron Parish's resources to protect against the hurricane before it hit as well as roles of the federal, state, and local governing bodies on its future development through planning initiatives after the hurricane. Using literature review, state and local media coverage, and interviews with professionals in the field of planning and engineering, this report found that it took a massive hurricane to convey the need for planning in Cameron Parish, and that the flood maps used to provide risk do not communicate risk management as efficiently or accurately as intended.

Table of Contents

List of Figures	viii
List of Photos	ix
List of Tables	x
Chapter 1 Introduction	1
Chapter 2 Project Overview	4
FEMA's mapping revision places majority of parish in V or VE flood zones	4
Cameron Parish's housing stock after Hurricane Rita	8
Holly Beach	9
Cameron Parish's preliminary DFIRMs	13
Chapter 3 History of the problem	15
Cameron Parish, Louisiana	15
Hurricane Rita	17
Hurricane Audrey versus Hurricane Rita	18
Hurricane Rita: Katrina's little known sibling	21
Behavior and attitudes related to locating in high risk coastal flood areas...21	
Disaster and Development	22
Risk Behavior	24
Cameron Parish residents - "We will rebuild"	25
Chapter 4 Local, state, and federal roles in land-use for Cameron Parish	27
Cameron Parish's local planning initiatives	27
Louisiana Recovery Authority	28
Louisiana's state coastal comprehensive plan	29
Coast 2050: Toward a sustainable coastal Louisiana	30
National Flood Insurance Program (NFIP)	33
Flood Insurance Rate Maps (FIRMs) and Digital Flood Insurance Rate Maps (DFIRMs)	36

Advisory Base Flood Elevation (ABFE) Maps	39
The release of preliminary DFIRMs	42
The LRA appeal the preliminary DFIRMs for Cameron Parish.....	43
Disputing the technical and scientific data in the preliminary DFIRMs	44
ABFE grace period: a temporary solution	46
Chapter 5 How effective is FEMA to aid Cameron Parish.....	48
Temporary housing issues facing parish residents.....	48
DFIRMs and their usefulness in recovery and planning.....	49
Ambiguity in FEMA policy relating to coastal velocity zones.....	29
Chapter 6 Recommendations and final thoughts	52
Participation in the NFIP's Community Rating System.....	52
Community relocation	54
Final thoughts on an ongoing debate	57
Bibliography	60
Vita	65

List of Figures

Figure 1:	ABFE map for Cameron Parish.....	6
Figure 2:	Preliminary DFIRM for Cameron Parish.....	7
Figure 3:	Cameron Parish, Louisiana	15
Figure 4:	Hurricane Audrey and Hurricane Rita	20
Figure 5:	Location of Holly Beach along shoreline of the gulf coast	31
Figure 6:	Holly Beach in relation to the coast.....	33
Figure 7:	Cameron Parish 1992 FIRMet showing Holly Beach, LA area.....	37
Figure 8:	Closer view of Holly Beach, LA on FIRM.....	37
Figure 9:	ABFE Map panel for Holly Beach, LA	41
Figure 10:	DFIRM development as was anticipated at release	42
Figure 11:	Close up of Cameron Parish ABFE data showing Holly Beach.....	44
Figure 12:	Cameron Parish Preliminary DFIRM data showing Holly Beach....	44
Figure 13:	Frederick LaBove Property Temporary Housing Site	49

List of Photos

Photo 1:	The aftermath of Hurricane Rita in the Town of Cameron.....	9
Photo 2:	The aftermath of Hurricane Rita in the Town of Cameron.....	9
Photo 3:	Holly Beach, LA in 1998.....	11
Photo 4:	Holly Beach, LA in 2005.....	11
Photo 5:	Closer view of Holly Beach, LA, in 2001 and 2005.....	12
Photo 6:	Satellite image of Hurricane Rita.....	18

List of Tables

Table 1: Flood zones as represented on a flood insurance rate map.....	39
Table 2: Timeline for Cameron Parish preliminary DFIRM adoption	43

Chapter 1: Introduction

The hurricane season of 2005 distributed three massive hurricanes (Katrina, Rita, and Wilma) along the Gulf Coast from Texas to Florida in less than two months and destroyed much of what was in their paths. Of those three massive hurricanes of the 2005 season, Hurricane Rita was considered the third most expensive natural disaster in U.S. history with recovery costs in the billions, and it was captured as the fourth most intense storm ever to form over the Atlantic in recorded history (U.S. Department of Commerce).

One of communities hardest hit by Hurricane Rita was Cameron Parish, the largest land-wise parish on the southwestern coast of Louisiana. Winds, flooding, and storm surge created catastrophic damage to most all of the parish's coastal towns with Cameron and Holly Beach being "essentially obliterated" (Kurth and Burckel, 2006, p. 9, 28).

The rebuilding and recovery efforts in Louisiana after Hurricanes Katrina and Rita initiated new state and federal agencies and resources to assist one of the largest recovery efforts in the nation. Despite immediate efforts to restore those areas hit hardest, recovery for Cameron Parish has been slow due to the massive recovery effort to implement restoration due to lost infrastructure and housing (Kurth and Burckel, 2006, p. 28). Cameron Parish's recovery became further compounded by the introduction of the preliminary digital flood insurance rate maps (DFIRMs) to the parish community which places much of the parish in high risk coastal flood zone.¹

¹ High risk coastal flood zone is known as a special flood hazard area with a 1/100 chance of flooding with the added influence of storm surge.

New preliminary DFIRMS presented to Cameron Parish in March 2008, place eighty-three (83) percent in very high risk flood zones as opposed to the older flood insurance rate maps (FIRMs) designating thirty (30) percent of the parish in the high risk flood zones. Using the data from preliminary DFIRMS which have not yet been adopted by Cameron Parish, FEMA is denying funds to projects that consist of temporary housing and new construction in those high risk flood zones (Stephens, 2008).

FEMA's decision to use the latest available base flood elevation information found on the preliminary DFIRMS to guide their funding choices has resulted in huge delays over rebuilding efforts for Cameron. It has also contributed to a fear that if funding is not available, the parish will lose its population due to prolonged relocation elsewhere by residents unable to hold out to rebuild. The planning and redevelopment of Cameron Parish, therefore, could quite possibly have to consider extreme repercussions due to lack of funding available for redeveloping by the recent remapping of the floodplains. The current debate over the adoption of the preliminary DFIRMS is still being disputed by both the state of Louisiana and FEMA, and Cameron Parish anxiously awaits the outcome.

As Cameron Parish tries to repair itself after Hurricane Rita in 2005, and subsequently Hurricane Ike in 2008, questions are raised regarding how the parish can rebuild when faced with severe rezoning of its floodplains. How prepared was Cameron Parish for Hurricane Rita? What roles have the federal, state, and local governments taken towards guiding Cameron Parish towards a more sustainable community? What options are available to Cameron Parish to move forward while they are waiting the

appeal of the preliminary DFIRMS? This report investigates the scope of the situation facing Cameron Parish and provides two planning options that Cameron Parish should consider to help them recover and build stronger communities.

Chapter 2: Project overview

FEMA's mapping revision places majority of parish in V or VE flood zone

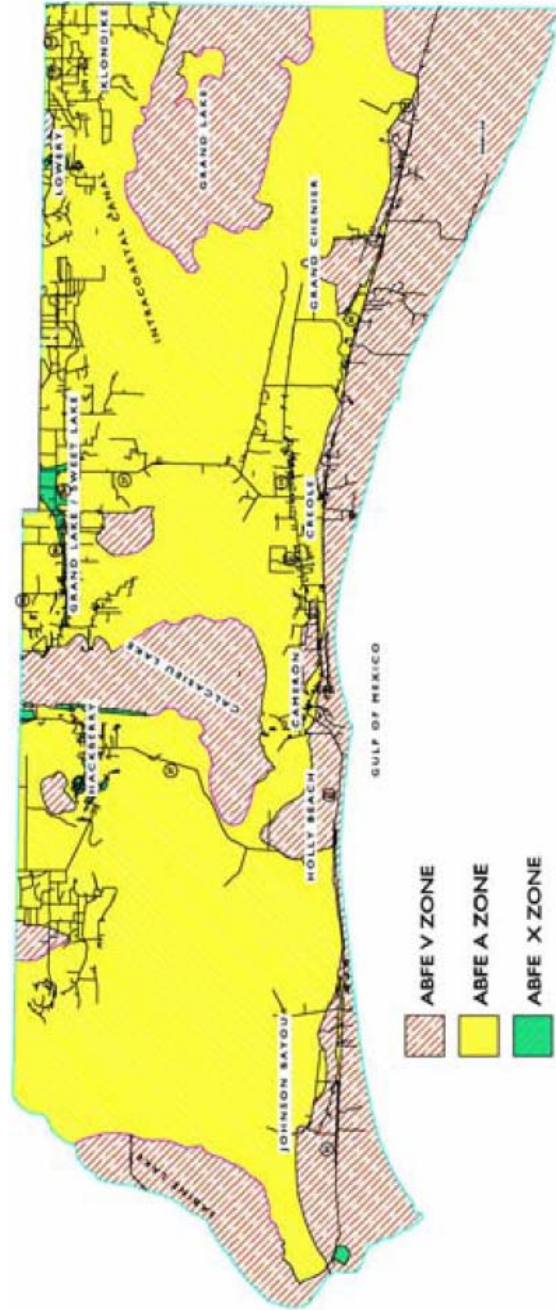
The parish is finding it difficult to effectively recover from Hurricane Rita while the “V-zone issue” remains unresolved (Cameron Parish Pilot, 2009). FEMA has decided to deny assistance to development in V-zones because they are not willing to continue to sponsor federal funding projects where the risks are too high. V or VE zones are flood zones that categorize high risk coastal flooding that take into account impacts from waves, hurricane-force winds, and coastal erosion. FEMA's decision to deny federal funding in V-zones is the basis for FEMA's reluctance to replace hurricane-damaged structures in areas of high risk of future flooding. They have previously experienced ongoing project designs in flood zones that had repeat flooding (Kirkham, 2008). FEMA is receiving criticism for deciding, that despite funding past projects in areas of repeat flooding, they are now going to rethink their motives regardless of the emergency situation in Cameron Parish. FEMA is showing itself to be unwavering. FEMA officials acknowledge local official's frustrations regarding the recent barring of new construction in coastal high-hazard areas, but Jim Stark, director of the former FEMA Transitional Recovery Office in Louisiana, responded to criticism by saying that because of the high risk flood zones, “it is incumbent upon us as stewards of the taxpayers' money to make sure we recognize that risk when we invest your money and mine in projects that may be destroyed” (Gonzales). Cameron Parish Planning Director,

Ernest Broussard, does not dispute that the parish is going to have to elevate structures and build to more stringent codes along the coastal area, but he feels the new DFIRMs are sending the wrong message to future homeowners that the entire parish is under the same risks as the coast (Kirkham).

Furthermore, FEMA is using the preliminary DFIRM maps, not yet adopted by the parish community, to guide them in their principles, and this is in violation of Executive Order 11988 according to parish attorney Jennifer Jones. FEMA's use of the preliminary DFIRMs that are not yet legally adopted by the community violates this executive order regarding floodplain management responsibilities by federal agencies.

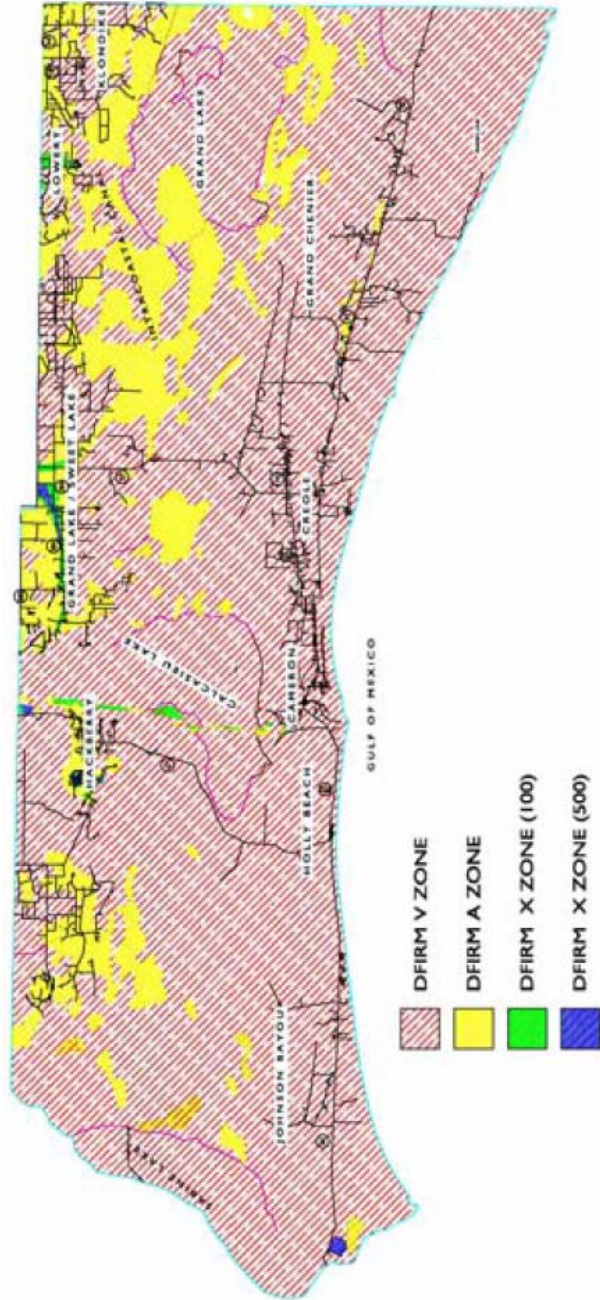
The preliminary DFIRMs placement of eighty-three percent of the parish in V-zones as opposed to the currently adopted ABFE maps that place a considerably lesser thirty percent of the parish in V-zones is significant in creating limitations for recovery and rebuilding efforts for the parish. As the preliminary DFIRMs are being appealed based on scientific and technical merit because the parish does not believe the maps present the "best available data", FEMA's use of the maps to refuse needed funding to rebuild is further suppressing Cameron's chances of rebuilding quickly.

Figure 1 - ABFE map for Cameron Parish



Source: Lonnie G. Harper & Associates, Inc

Figure 2 - Preliminary DFIRM for Cameron Parish



Source: Lonnie G. Harper & Associates, Inc

Cameron Parish's Housing Stock after Hurricane Rita

Many of the homes in Hurricane Rita's path were destroyed or substantially damaged, so much so that "some feared it could be the end of a way of life for the predominantly Cajun population" (Kurth and Burckel, p. 28). According to the U.S. Housing Market Conditions May 2006 report by the U.S. Department of Housing and Urban Development (HUD), "1.2 million housing units received some damage and more than 309,000 units sustained major or severe damage from one or more of hurricanes [Katrina, Rita, and Wilma]" (p.8). Per the 2000 census, there were 3,056 owner-occupied housing units and 536 renter-occupied housing units in Cameron Parish before Hurricane Rita (HUD, p. 21). In Cameron Parish, 72 percent of those occupied housing units encountered serious damage. Among those 2,576 units with serious damage, the median cost to repair was estimated as \$126,657, and of the 2,025 seriously damaged units, 63 percent did not have any insurance to cover damages (HUD, p. 12). Minor damage was calculated as "make ready" repairs to homes costing \$5,200 or less to restore a home to livable conditions, while major or severe damage to homes described a structure in substantial need of rehabilitation or reconstruction. Of those homes that suffered major or severe damage, 71 percent were destroyed due to heavy and sustained flooding of property (that also included storm surges), and one-third of those flooded units were outside of special flood hazard zones (also known as a 100 year floodplain) as designated by the Federal Emergency Management Agency (FEMA) (HUD, 2006, p. 8-9).

Photos 1 and 2 - The aftermath of Hurricane Rita in the Town of Cameron



In the Town of Cameron, two elementary schools and the high school were completely destroyed, and the loss of many public facilities such as libraries, fire stations, Sheriff's Department, Police Jury Annex building, and several multi-purpose facilities put a strain on the recovery effort (Kurth and Burckel, pp. 34-35). Furthermore, it was estimated that more housing would need to be constructed to house 2000 workers hired to clean up and restore the Town of Cameron (Kurth and Burckel, p. 38). According to Jones, a life long resident of Cameron Parish in Grand Chenier, FEMA has provided temporary housing in V-zones such as a few park-model trailer homes, but it has taken so long to cut through the bureaucracy that people could not remain "homeless" and moved away from the parish. Her opinion is that most people who have not yet returned are probably not coming back.

Holly Beach

The most devastated community, Holly Beach, Louisiana, was a seaside community located on one of the few sandy beaches along the Louisiana coast. It was considered primarily a resort town and an ideal spot for a weekend's vacation or seasonal

get-away from more northern inland towns and communities. Many of the homes were small camps as well as some large secondary or vacation homes that lined the shoreline. Holly Beach suffered obliteration by Hurricane Rita's high winds and storm surge. It endured the earliest and most direct effects of the storm. There are no hurricane protection levees in the area or barrier islands shielding the beach from storm inundation, and the homes are built right up to the vegetation line. It is unlikely that Holly Beach could have done anything to protect itself as it was extremely vulnerable based on its proximity to the shoreline and lack of structural or natural wind and storm surge protection.

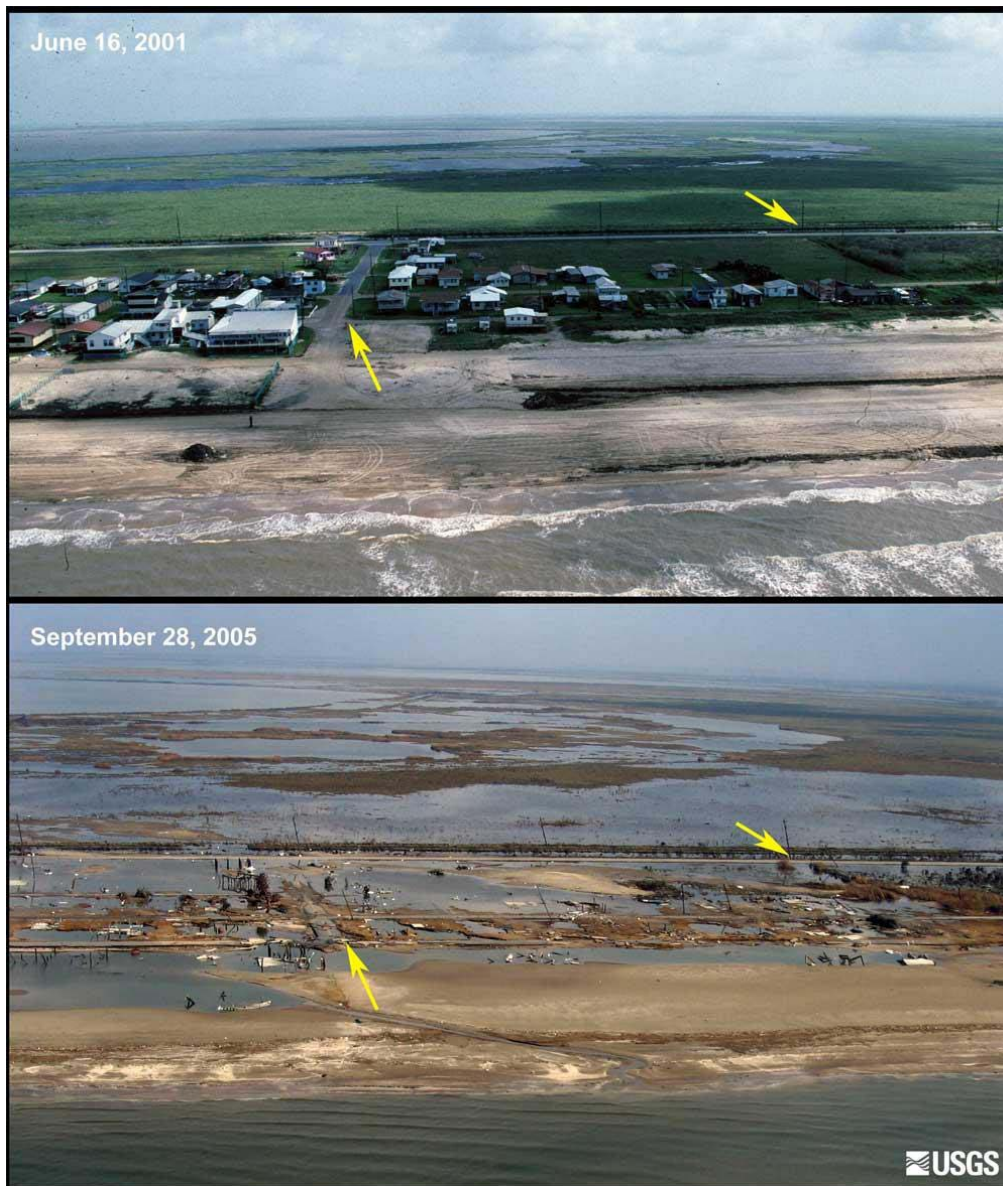
Photo 3: Holly Beach, LA in 1998



Photo 4: Holly Beach, LA in 2005



Photo 5 - Closer view of Holly Beach, LA, in 2001 and 2005



Source: USGS

The risks associated with its proximity to the shoreline forced policymakers to consider relocation of the community (Longman). When asked if there were plans to relocate Holly Beach, Jones, who works closely with the parish administrator and

planning director, did not know of any. Few residents, though, have returned to rebuild and because of the cost of elevating, and according to Jones, only those who have rebuilt are the wealthy. Jones stated that it cost \$120,000 for the foundation and elevation of her own house in Grand Chenier, and it took over two years before she was able to return to her rebuilt home. The median value of home owner-occupied housing units in Cameron Parish was \$59,600 in 2000 (U.S. Census, QuickFacts). Most parish residents are unable to afford the costs associated with elevation without assistance.

Cameron Parish's Preliminary DFIRMs

Relying upon the guidance of the NFIP's Advisory Base Flood Elevation (ABFE) maps, Cameron Parish had plans to redevelop with safer structures by following federal regulations regarding high risk hazard floodplain and storm surge areas. In March 2008, FEMA presented the new preliminary DFIRMs for Cameron Parish which, when they become effective, will be the legal document used in rating flood insurance. It will supersede the adopted ABFE maps currently being referenced in guiding the parish for reconstruction and recovery. The ABFE maps afforded the parish the options to plan for reconstruction in most places that had existing development because even though the ABFEs represented a revision that was long over due, the amount of property still within a high risk coastal flood zone did not deviate much from the old data. When the preliminary DFIRMs were introduced to the community, it presented heavy restrictions on how the community was to plan future development using federal disaster relief funds. The parish was not planning for relocation but rebuilding (Flood map Backstory To Battling FEMA). The identified areas with the riskiest zones, V and VE, within the new

DFIRM maps immediately came under scrutiny for Cameron Parish because the new V and VE zones extend far beyond the coastline into the northern prairies. Cameron Parish's location near natural hazards such as hurricanes is problematic in itself, but the preliminary DFIRMs can either be considered a cautionary tale or a wake-up call depending on how long one has lived in the parish and has grown up with its history of hurricane activity.

Chapter 3: History of the problem

Cameron Parish, Louisiana

Cameron Parish was officially created in 1870. Cameron Parish is one of the few parishes that formed out of a political favor; the parish became an official seat in the legislature under Colonel George W. Carter by his friend, Governor Henry Clay Warmoth, when Carter failed to win over his home parish, Calcasieu. (Wilds et al, p. 199) Early settlement in the region were exiled French Canadians, later known as Acadians, that settled in the vast marshes and prairies.

Figure 3 - Cameron Parish, Louisiana



Land speculation in the 1830s and 1840s enticed prospective landowners to migrate from the East Coast and southern neighboring states, and Cameron Parish's access to waterways connected its ports to Galveston and New Orleans further exposing Cameron Parish to pioneers and settlers. Settlements, though mostly pioneer farms, also supported cattle, cotton, cane, and oranges that were raised for outside markets (Cameron Parish Police Jury, Parish History). Today, the largest employing industries are seafood, education, oil exploration, and health care (Kurth and Burckel, 2006, pp. 28, 34).

Cameron is the southwestern-most parish in Louisiana that borders Texas and covers 1,932 square miles, thirty-three percent of which is water. The largest parish land-wise in Louisiana, it had already one of the smallest populations at just under 10,000 residents yielding a density of less than 8 people per square mile before Hurricane Rita (Cameron Parish Police Jury, Parish History). Geologists have claimed the parish to at times been both under the waters of the Gulf of Mexico and far inland of the coast due to its ever changing shoreline (Wilds et al, p. 255). The Chenier Plain, an unusual geological formation of extensive marshes crossed by tree covered ridges, stretch across the parish coastline (Gomez, p.1). Cameron Parish's marshes and wetlands work to provide a buffer from high wind velocities and storm surges, but the region is still vulnerable. The southwestern parishes in Louisiana are exposed to hurricanes which have hit the region with damaging force in 1886, 1915, 1918, 1940, and 1957 (Wilds et al, p.255).

The greatest natural disaster that ever struck Cameron Parish in their history before Hurricane Rita was Hurricane Audrey. Hurricane Audrey, in 1957, killed

hundreds of parish residents and caused major destruction to the parish's infrastructure (Blanchard, 2006). The death toll of Hurricane Audrey outnumbered other hurricanes that have fallen upon the parish, including Hurricane Rita, but the lasting devastation of Hurricane Rita far outweighed all recovery efforts in Cameron Parish's history of exposures to hurricanes. Unable to return to their homes for three months after Hurricane Rita, the residents of Cameron Parish were rendered vulnerable to not only the storm but to the local, state, and federal agencies methods of precautions to ensure a safe and secure area to which they could return. Many, when the mandatory evacuation was lifted, would not be returning to homes but instead piles of debris and rubble. The devastation caused by the storm was catastrophic in some areas and debilitating in others.

Hurricane Rita

Hurricane Rita made landfall as a category 3 storm near Sabine Pass, Texas, along the Texas-Louisiana border, on September 24, 2005, three weeks after Hurricane Katrina struck New Orleans. According to "The Rita Report: A summary of the social and economic impact and recovery of Southwest Louisiana one year after Hurricane Rita", winds were in excess of 120 miles per hour and were pushing a 20 foot storm surge, which contributed to the expected repair and recovery costs exceeding \$10 billion (p. 3-7).

Photo 6 - Satellite image of Hurricane Rita



Source: NOAA

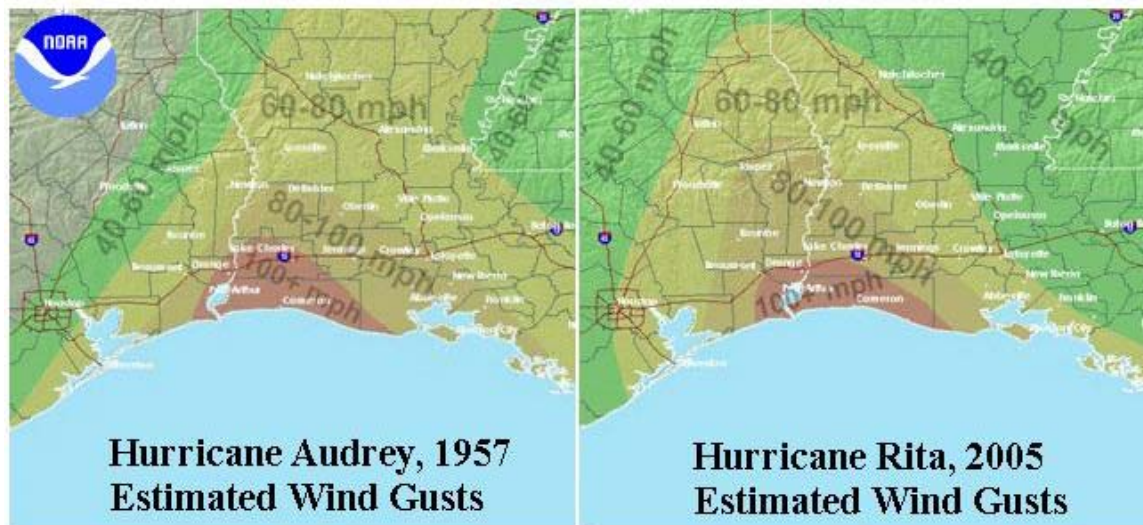
Hurricane Rita was a category 5 storm as it swept over the Gulf of Mexico damaging many oil and natural gas platforms in the open waters (p.6). Only one death, a drowning, was linked to Hurricane Rita in Louisiana as most residents, still recovering from Hurricane Katrina just three weeks earlier, listened to the warnings of local officials and took Rita's approach very seriously by evacuating areas of Louisiana expected to absorb the largest impact (p. 10). It would not be until January 5, 2006, that the mandatory evacuation order was lifted and residents could return to their homes to assess their damages and begin recovery efforts.

Hurricane Audrey versus Hurricane Rita

The most memorable Hurricane to directly hit and cause massive damages to Cameron Parish was Hurricane Audrey in 1957. Hurricane Audrey was a Category 4 hurricane when it made landfall and created as much infrastructure and physical damage

to the same area as Hurricane Rita. Hurricane Audrey also caused floods as far as twenty to twenty-five miles inland that resulted in 350 deaths (Wilds et al, p. 138). The vast difference in casualties between Hurricanes Audrey and Rita was dependant on the actions of the community to evacuate early. Cameron Parish, in 1957, was provided hurricane warnings via the radio and television. Radio reception was not that strongly received in the parish, and television was not widely used or available at that time (NOAA). Those that did listen to the warnings that came several hours before Hurricane Audrey hit were able to escape on open roads. It was the mostly long-time residents to Cameron Parish who felt they could ride out the hurricane (because early June storms were unheard of) that fell asleep and waited for the hurricane to pass. When some woke as the hurricane neared, they found themselves trapped as the roads were already flooded with the storm surge (NOAA; Smith, 1957). The unpredictable nature of hurricanes makes evacuation a vital part of hurricane protection. Hurricanes can change course and speed at any moment as was the case with Hurricane Audrey as it intensified from a Category 2 to a 4 within hours (Carr, 2007).

Figure 4 - Hurricane Audrey and Hurricane Rita comparison of estimated wind gusts



Source: NOAA

Hurricane Rita: Katrina's little known sibling

In August 2005, Hurricane Katrina made landfall over a major U.S. city, New Orleans. The hurricane protection system that consisted of infrastructure such as levees and floodwalls around the city failed to withstand the high winds, floods, and storm surges, and thousands were displaced and/or died (ASCE, p. v). Many evacuees fled to Cameron Parish, so when Hurricane Rita came, some that evacuated Cameron Parish because of Hurricane Rita would be escaping a second Category 3 hurricane only a month after their first evacuation (Carr, 2007; Weeber, 2009). There is no one reason for the disaster or destruction that took place in New Orleans as the hurricane protection system was not the only reason New Orleans was so devastated by Katrina:

The problems that led to poor decision-making – the root cause of the catastrophe in New Orleans – thus lie within and amongst the cultures of key organizations.

Protecting against life-threatening risk was put on the back burner of public priority” (ASCE, p. 7).

The profound significance in sound hurricane protection systems and emergency response evacuation was made evident by Katrina, but the lessons learned and still being learned from Katrina transcended the boundaries of New Orleans. The attention given to Hurricane Katrina exposed technical failures and policy inadequacies that left the state, and the nation, wondering how the massive deaths and physical and ecological damage from the storm could have been reduced, if not prevented. Hurricane Rita was dwarfed by Hurricane Katrina not in size but in global significance and commanded all the media’s focus; “Cameron Parish was destined to become the forgotten wasteland of the forgotten storm” (Weeber, p. 50).

Behavior and attitudes related to locating in high risk coastal flood areas

Hurricane protection and recovery encompasses both structural methods and behavioral processes that need to work together to provide the best defense against hurricane damages and disaster related deaths. As more studies are focusing on coastal restoration and targeting how “coastal ecosystems are under stress from a variety of human activities [as] many have experienced widespread degradation,” the relationship between science and policymakers is evolving and becoming more integrated as a means to try to get nature and societies working together; “Policy to adjust human behavior cannot be effective without a basic knowledge of both the natural and the human systems” (National Research Council, p. 1, p. 44). In the case of Cameron Parish, Hurricane Rita’s destruction was not the result of faulty levees or flood walls, but instead flooding and storm surges that extended far inland. Questions linger as to whether or not

those coastal communities might have been able to prepare enough for the strong storm surge. Cameron Parish's larger inland lakes, Sabine Lake and Calcasieu Lake, experience tides and can increase its water level for a few hours during a storm (ASCE, p16). Lake Ponchartrain, the northern boundary of New Orleans, experienced twelve foot high waves above sea level as the storm surge and inundation of heavy rains increased the water levels during Hurricane Katrina (ASCE, p. 16).

Disaster and Development

Disasters are defined as traditionally physical environmental events, a "natural hazard" that can cause harm to people, though loss of life need not be the sole criteria for definition; loss of "development potential" can define disaster, as well (Collins, p. 13). Natural hazards are extreme events in nature that can cause harm to human life, property, and community. Natural hazards are usually defined in terms of risk and vulnerability. Risk is the potential loss associated with a hazard's frequencies, exposures, and consequences that will result in injury or damage in a geographic area (APA, p. 329). Vulnerability is the susceptibility of an area or structure to damage from a natural disaster (Emmer et al, p. 6).

The "quest to determine disaster in terms of vulnerability is fundamental "as "changes in vulnerability are influenced by development" (Collins, p.14). An area's vulnerability can depend on any of several criteria such as its proximity to a potential disaster, public policies regulating land-use development, individual perceptions related to hazards, building codes applied to structures, and ability to adjust to changing environmental conditions.

How a community can gauge and adjust its level of vulnerability contributes to its effectiveness in responding to a natural hazard. “Disasters...can be adapted to by improving people’s ability to cope with a crisis or by increasing their resilience to environmental change” (Collins, p. 60). Policy geared towards land-use designations favoring extended distances from a hazard could contribute to smarter growth and lessen the costs associated with building to stricter building codes. Disaster resistant infrastructures are more expensive because they are materials designed to remain intact against storm surges, wind, and floods, but they are necessary when increasing one’s risk by locating closer to disaster potential. In the case of Cameron Parish, rebuilding has been hindered by the construction costs being driven up by having to comply with new building codes (Blanchard, 2006). Stringent building codes that require elevation of a home as much as 20 feet off the ground to protect against flooding can place a large burden on the home owner and does not guarantee withstanding high winds or storm surges if they are located close enough to the shoreline. In areas of repeat flooding and winds, the stakes get higher as more resistant structures would still add to the increased cost of disaster recovery should they need replacing after a storm.

A community’s economic stability can also be an indicator of the methods they use to decrease their vulnerability to disaster, whether structural or through policy; “wealthy countries can afford the ‘developmental’ costs of mitigation while developing nations lean towards policy shifts” (Collins, p. 231). Although much of the oil and natural gas industry in the U.S. depends on the coast of Louisiana to be able to produce, it is not considered a wealthy region as the median household income in Cameron Parish in

2007 was \$40,460 (US Census, QuickFacts). Major urbanized areas of the coast would be given priority over smaller communities, as well, in regards to the construction of high levels of structural hurricane protection as stated in the state's own coastal comprehensive plan; "scaling the level of protection to the population and infrastructure at risk is the best way to build a case for the major federal appropriations" to fund and build projects (Plan, p. 72). This acknowledgement of the expense of infrastructure shows that state policy leaders recognize that the most efficient methods to reduce risk and vulnerability would be to adopt non-structural methods to guide development where ever possible.

Risk Behavior

Why do people develop in such high risk areas? Cameron Parish's coastline is susceptible every hurricane season to tropical depressions that can turn into hurricanes of varying degrees. As history has shown, decades can pass before a hurricane that wreaks havoc can strike, yet several can strike in the same season and each can be very destructive. Why then, is settlement in high-risk areas supported and why do we allow encroachment upon high risk areas? Disaster losses are a result of interaction between the earth's physical systems, humans, and physically constructed projects (infrastructure, dwellings, and roads) (Mileti, p. 106-7). Cameron Parish can benefit from more recent knowledge about floodplains and from advanced technology for mapping and predicting natural disasters in order to protect against flood damage. The advantages of having the knowledge and technology can influence resilience, but it still does not seem to persuade everyone against living in coastal areas; "as more disasters strike more frequently over

time, people feel they have grown wiser in terms of their behavioral responses to disasters...they feel less threatened” (Asian Disaster Preparedness Center, p. 10).

If, when, how, and why one chooses to locate in floodplains is what Gilbert White (1964), a career standing researcher of human adjustment to floodplains and the “father of floodplain management”, considers being a person’s “flood risk behavior” (p. 8). The cause of “flood risk behavior” often depends on the person and the resources available to them such as range of choices, personal and professional opinions, perceptions of how they can take advantage of technologies around them, spatial linkages between floodplains and other locations, and complex social constraints (White, 1964, p.8). These elements of “risk-taking behavior” highlight that there are several reasons people use to justify or rationalize risk when locating in a floodplain. White also discussed in his research paper, Assessment of Research on Natural Hazards, influences of “risk-taking behavior” such as experience of the individual with this hazard, material wealth of the individual, access to technology and information, security against losses, and their personality such as responsiveness to new information on threats or the way individuals feel they have the capacity to control their environment and fate (p. 100).

Cameron Parish residents - "We will rebuild"

Gilbert White’s insights into flood risk behavior can be echoed in the attitudes of those willing to relocate back in Cameron Parish. The parish residents are known for having generations of family lineage staked in the area, and home is more than a house (Carr). Louisiana planners proposed the idea early on to move entire seaside towns 15 to 20 miles inland to higher ground out of harms way, but the thought received resistance

from the communities (Longman, 2005). Parish residents have voiced their disappointment in the actions of the federal government during their recovery, and remain “suspicious that outsiders will dictate their future with prohibitive building codes and flood insurance requirements” (Longman). Cameron Parish rebuilt quickly after Hurricane Audrey due to less stringent building codes and clean-up procedures, and it is believed that without the recent urge to build at higher standards the parish would’ve rebounded sooner this time around (Blanchard). The nature of communities is to focus recovery efforts in trying to bring the communities back to how they were before the disaster occurred, but it is incumbent among planners to look at recovery periods as opportunities to change land-use that originally put people at risk (Emmer et al, p. 66). Recovery planning was not in any future plans for Cameron Parish before Hurricane Rita, and only until after Hurricane Rita did the parish hire a planner to design a long-range plan (Blanchard).

Chapter 4: Local, state, and federal roles in land-use for Cameron Parish

Cameron Parish consists of mostly rural land with small communities, some being bedroom coastal communities and others supporting the workers in the region's major industries. Before 2005's hurricane season, Cameron Parish never developed their own comprehensive plan nor followed any overall comprehensive plan by state or federal mandates. Louisiana law does not mandate parish or municipal plans unless a planning commission is created (Emmer et al, p. 21). Just recently have the state and the local Parish Police Jury outlined coastal restoration plans, emergency preparedness, and recovery plans in reaction to Hurricane Katrina and Hurricane Rita. Cameron Parish's initiatives to provide a comprehensive local land-use plan coupled with the state's comprehensive coastal plan is a first attempt towards planning the sustainability of the parish in the event of another hurricane.

Cameron Parish's local planning initiatives

At a local level, the parish has chosen to make strides towards planning as a reaction to the storms to guide their future towards sustainability. Director of Planning for Cameron Parish, Ernest Broussard, was hired on after Hurricane Rita in 2006 to form Cameron Parish's first planning department dedicated to enforcing codes and future land-use rules (Blanchard). According to Broussard, planning in Cameron Parish before the hurricanes did not really exist. The growth pattern of Cameron Parish being linear, along roads and major transportation routes, and the relatively small size of population throughout the parish, did not seem to warrant planning directives from the parish

residents and leaders. This meant that there were no transportation, land-use, or economic development plans in parish history to guide future development or use to guide recovery efforts. Since Rita, Broussard has organized long range recovery, transportation, housing, zoning, subdivision, and economic development plans for the parish. He has yet to release a comprehensive document, but excerpts of his department's housing plan focuses on ways to accelerate recovery efforts and offer inventory analysis of historical data as well as current conditions, goals, and visions to account for lack of inhabitable housing in the wake of Hurricane Rita and Hurricane Ike (Cameron Parish Housing Plan).

Louisiana Recovery Authority

The Louisiana Recovery Authority (LRA) was created after Hurricanes Katrina and Rita and put in statute through Act 5 of the 2006 1st Extraordinary Session of the Louisiana Legislature. It functions as a coordinating and planning body of Louisiana that works closely with the Governor's Office of Homeland Security and Emergency Preparedness to rebuild Louisiana and oversee the recovery effort. Its earliest missions were to provide a single voice for the State on disaster-related issues and activities, focus on major policy, and provide regulatory and legislative change to meet disaster needs (Kurth and Burckel, p. 18). The LRA would become instrumental in the debate with FEMA for accurate flood insurance rate maps as it would assume responsibility as the state agency challenging FEMA about the preliminary DFIRM's accuracy against Advisory Base Flood Elevation Maps (ABFE).

Louisiana's state coastal comprehensive plan

The state of Louisiana has historically exhibited little control and leadership to guide local planning (Emmer et al, p.21), but recent steps have been made to develop a state-wide comprehensive plan to protect the coastal region that is vital to Louisiana's economy. The state of Louisiana formulated a state-wide coastal comprehensive plan for a sustainable coast which was developed to fulfill the mandates of Act 8 passed by Louisiana legislature in November 2005. The state's comprehensive coastal plan emphasizes coastal protection and restoration to "promise safer communities and a more sustainable landscape" (Blanco). The coastal master plan, called "Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast," was created because of the identifiable need in Louisiana for a state-wide comprehensive planning approach for hurricane protection and coastal restoration measures. The plan was established in April 2007, and it is considered a "living document." The plan's overall focus is to offer large-scale solutions to problems that have not been solved by smaller, localized efforts. The long-term efforts include restoring Louisiana's depleting wetlands due to human encroachment as well as providing better hurricane protection through structural and non-structural measures (Plan, 2005).

Since the plan is an evolving document, it seeks public participation to succeed in its long term coastal protection and restoration endeavors. Several concerns and proposed solutions were added to the plan on August 17, 2009, that stemmed from comments voiced during a series of public participation events. One concern specifically, Concern #4: Velocity Flood Zone (V-zone) and DFIRMs, targeted the uncertainty

surrounding the new FEMA flood maps. The concern questioned how the “cumulative effects of FEMA V-zone and DFIRM policies combined with the [Army Corps of Engineers] new elevation and levee standards” will leave a profound effect on Cameron Parish. This particular concern emphasized the fear that FEMA policies could have “the potential to force massive relocations of our coastal communities – redrawing the map of Louisiana forever and eliminating some of our most treasured cultures” (Concerns, 2009). The proposed solution to this concern was to “require transition plans for FEMA and Corps policies, as was granted to a region in California that was allowed ten years to comply with updated standards to transition its towns away from the flood zones” (Concerns, 2009).

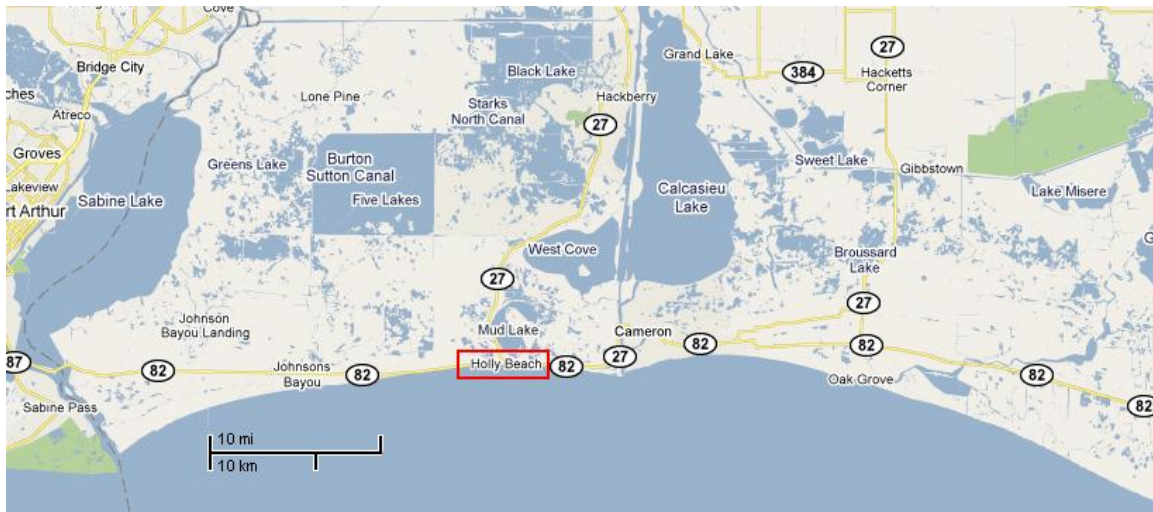
Coast 2050: Toward a sustainable coastal Louisiana

Coast 2050: Toward a sustainable coastal Louisiana, is a joint coastal restoration and conservation effort undertaken by federal, state, and local entities as well as professionals and academics to “maximize common ground between ecosystem needs and publicly acceptable restoration solutions” (National Research Council, p. 70). Drafted in 1998 as mandated under the Breaux Act of 1990, it was one of the first plans that utilized diverse groups of stakeholders and interested parties to contribute to the awareness of depleting wetlands and to take actions to restore them (Coast 2050, p7). The plans overarching goal is to “sustain a local ecosystem that supports and protects the environment, economy, and culture of southern Louisiana, and that contributes greatly to the economy and well-being of the nation” (Coast 2050 p. 2). Damages incurred by hurricanes to the ecological system have many consequences for its disturbance to

wetland species and wetlands themselves. Also, as we develop more along the coastal areas of Louisiana, we encroach upon the wetlands and weaken them. “Public perception is that hurricanes are increasing over the years when in fact it is the increase in damages due to coastal migration that looks like hurricanes are getting worse” (Meade and Abbot, p. 4). As people are moving to the coast at an increased rate the risk of damages increases. White’s assessment of the “flood problem” was “how to maximize use of floodplain with minimum social costs” and “how to readjust land occupancy and floodplain phenomenon in a harmonious relationship” (White, p. 4, 32). Preserving and restoring the ecosystem targeted by Coast 2050 is a way to foster that harmonious relationship between wetlands and human occupancy.

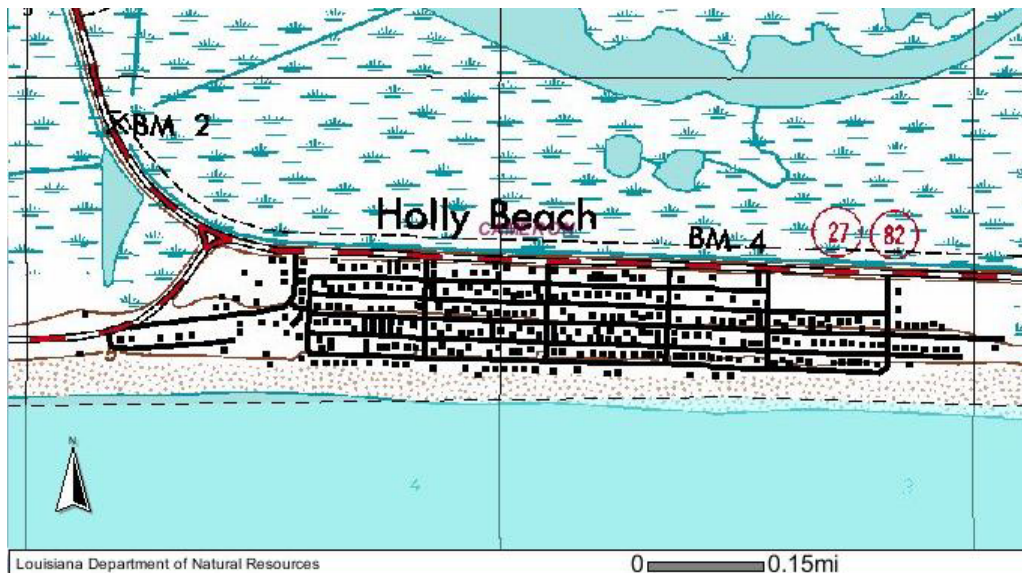
Holly Beach was targeted in the 1998 coastal restoration plan as one of several vignettes chosen as “communities at risk” (Coast 2050, p.66). In Coast 2050, the reason it was viewed as at risk was due to its dependence on LA Highway 82 and 27 for evacuation.

Figure 5 - Location of Holly Beach along shoreline of the gulf coast



LA Highway 82, the northern boundary of Holly Beach, is considered the Gulf of Mexico shoreline after years of coastal erosion of further southern coastal ridges (Coast 2050, p. 66). The highway is unable, after several attempts, to relocate any further north for lack of suitable soil due to the marshes. According to Coast 2050, if this last ridge is breached, then the marshlands will become susceptible to saltwater intrusion and become open water thus swallowing the highway and losing one of the only evacuation routes for Holly Beach and surrounding communities as well as eliminating a route for business and transportation (Coast 2050, p. 68).

Figure 6 - Holly Beach in relation to the coast



Coast 2050, requested immediate plan implementation to allow the wetland's natural protection against storms benefit surrounding communities soon as the wetlands could take decades to restore. The plan accounted for emergency evacuation as reason for coastal restoration and cited fear of isolating Holly Beach from evacuation routes as reasons for concern.

Though Coast 2050 was not a plan designed to provide recommendations for land-use, its long term wetlands restoration aimed to benefit the stabilization of the ecosystem was a step in recognizing the need for policy measures in restoring wetlands and natural hurricane protection systems.

The National Flood Insurance Program (NFIP)

The federal government does not have an overarching federal policy that governs all land-use in the U.S., but it does have 50 federal laws and executive orders that relate

to hazards management (Mileti, p. 158). The federal government has made 545 presidential disaster declarations between 1996 and 2005 (Richardson et al, p. 29). To try to mitigate the need for disaster funding as well as provide guidance related to the risks of floodplain development, the federal government created the National Flood Insurance Program (NFIP), a public-private partnership between the federal government and private insurance industries to regulate flood insurance premiums. The NFIP, created in 1968, was a response to decades of financial hardships and loss of lives due to catastrophic storms causing devastating floods. The private industry could not, alone, provide affordable flood insurance, and disaster relief provided by the federal government was overwhelming for the tax payers to fund. This created an unstable system in dealing with the loss caused by flooding. The program's intentions were to "better indemnify individuals for flood losses through insurance coverage, reduce future flood damages through State and community floodplain management regulations, and to reduce Federal expenditures for disaster assistance and flood control" (National Flood Insurance Program Description [NFIP], p. 2). Cameron Parish has been a part of the NFIP since 1970. Although this report did not investigate whether or not the parish and its communities were consistently compliant with the program's guidelines, FEMA does try to conduct periodic community assistance visits with participating communities to make sure they are complying with the rules. If they are found to not be in compliance, FEMA can suspend them from the program until the community proves they can enforce the adopted guidelines. Cameron Parish is currently not under any suspension and that can imply that they are following NFIP's minimum standards.

Though the Federal Emergency Management Agency (FEMA) administers the NFIP, participation in the program is voluntary but carries incentives that encourage participation. For instance, voluntary communities participating in the regular phase of the program qualify for subsidized insurance premiums as well as funding relief from a disaster declaration. As of 1973's amended NFIP policy, all federally backed loans require flood insurance on properties in the special flood hazard areas (NFIP, p. 3). This part of the program is not voluntary.

The NFIP's mandating the purchase of flood insurance on their loans insures the government's investment and brings awareness of at least a financial risk to locating in a floodplain, but its subsidization of the insurance premiums have been argued to reduce people's perception of risk as a whole. The argument against subsidized premiums is that the premiums should reflect the real risks associated with the hazards affecting a location. If premiums were to reflect the actual payout should a structure flood, chances are premiums would be extremely expensive. The idea of subsidized flood insurance also is not indicative of the levels of risk associated with different natural hazards that can plague an area. Lowered premiums based on subsidies do not clearly communicate the risks associated with where a property is located on a FEMA flood map if homeowners are paying the same for flood insurance along the coastline as they are inland. It can be argued that subsidies "encourage development of hazard-prone areas in ways that are costly to the home owner and the rest of society who will incur the costs of bailing out the victims" (Richardson et al, p. 19). To better communicate the risks associated with floodplain development, the rates of flood insurance should be representative of the risks

where the structures are built by setting premiums that reflect the risk of locating in high hazard areas (Richardson et al, p. 18).

Flood Insurance Rate Maps (FIRMs) and Digital Flood Insurance Rate Maps (DFIRMs)

The NFIP communicates floodplain risk through flood insurance rate maps (FIRMs). These maps showing floodplains are an effort to identify flood-prone areas and provide flood insurance to those located within those flood zones to actuarially rate new construction for flood insurance (NFIP, p. 2). The maps create an awareness of the flood hazards and provide the data needed for floodplain management programs. FIRMs are designed based on data available through the FEMA's modeling and surveying resources such as coastal oceanic modeling, wave height analysis, and hydrological and hydraulic models.

Figure 7 - Cameron Parish 1992 FIRMette showing Holly Beach, LA area

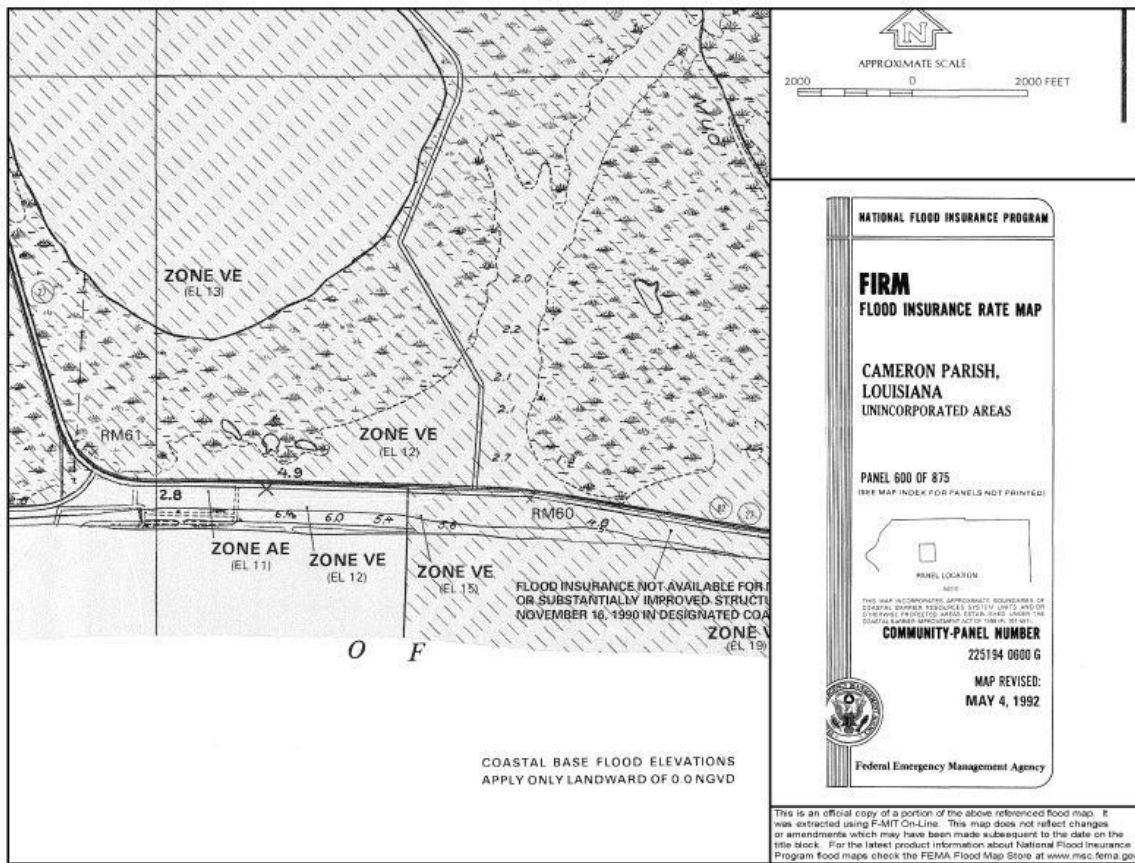
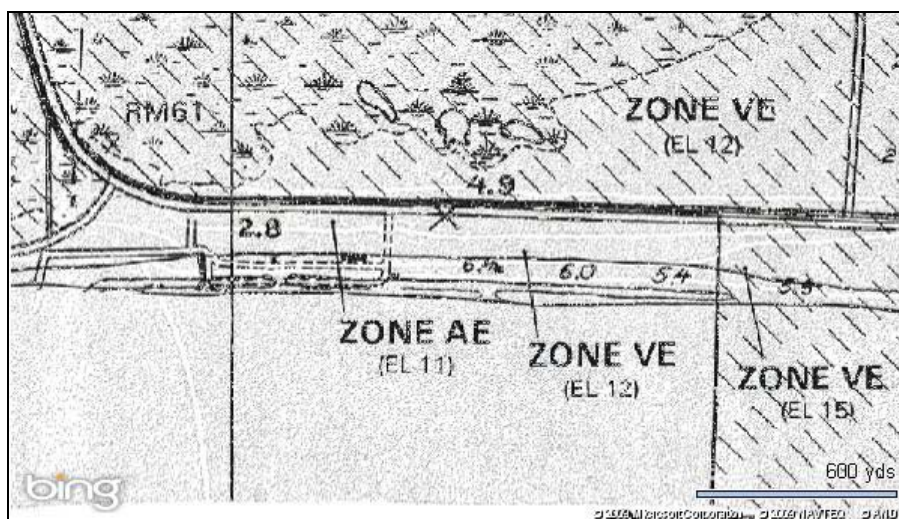


Figure 8 – Closer view of Holly Beach, LA, on FIRM



Through a program called the Map Modernization (MapMOD) program FEMA set out to invest in revision and digitization of all of the nation's FIRMs. This stemmed from the awareness that many of the nation's maps were severely outdated. The newly digitized documents are Digital Flood Insurance Rate Maps (DFIRMs) and represent updated information as the paper maps transition to a database inventory and are available electronically (FEMA, 2006).

The type of flood zones within a DFIRM influences the insurance rates of which flood insurance premiums are based. On a map, flood zones are represented as spatially digitized areas that FEMA has defined and categorized according to varying levels of flood hazard risk. Flood zones fall within three basic categories: Low Risk Areas (low or no risk of flooding), High Risk Areas (100 year floodplain), and High Risk Coastal Areas (100 year floodplain with an additional hazard associated with storm surge). High risk flood zones, categorized by V or VE, are defined by FEMA as "an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources" (www.fema.gov).

Table 1 - Flood zones as represented on a flood insurance rate map

Levels of Risk	Flood Zones
Low Risk Areas	B, C, X, X500
High Risk Areas	A, AO, AH, A1-A30, AE, and A99
High Risk Coastal Areas	V and VE



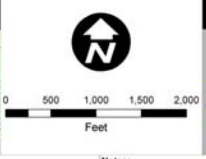
Advisory Base Flood Elevation (ABFE) maps

In November 2005, FEMA recognized that Hurricanes Katrina and Rita had significantly changed the landscape of the Louisiana gulf coast, and new Advisory Base Flood Elevation (ABFE) maps for Louisiana parishes impacted by the hurricanes were FEMA’s response to better flood risk data. FEMA wanted to develop advisory maps for up-to-date coastal flood risk information to use by affected communities and citizens during the rebuilding process while FEMA worked on completing new detailed Flood Insurance Studies (FIS) and DFIRMs for the affected areas of Hurricane’s Katrina and Rita. ABFEs were only created where Presidential disasters have been declared as well as in the case that the storms have significantly altered the floodplains and/or the current FIRM base flood elevations were outdated (LaMap, FAQ). The ABFE maps reflect the extent and magnitude of Hurricane Katrina and Rita’s storm surge, as well as information on other storms over the past 25 years (LaMap). The FIRMs for Cameron Parish were last updated in 1992. The flood hazard and risk information shown on those old FIRMs were developed during the 1970s, and the physical terrain had changed significantly (LaMap). Adoption of ABFEs are not mandatory, but adoption of the ABFEs, which at

the time reflected the “best available data”, makes funding available to various hazard mitigation programs aimed at reducing losses in future disasters. As such, the state and the LRA advocated for the adoption of the ABFEs until new FIRMS were created (Kurth and Burckel, pp. 20-21). By Cameron Parish choosing to adopt the ABFEs, they agreed to adhere to more stringent building codes to be able to withstand winds and, if located in a floodplain, to elevate buildings above the floodplain base flood elevations (Kurth and Burckel, pp. 19). Cameron Parish and the State embraced the ABFE maps because the maps represented trusted data, and Cameron Parish was determined to build its communities towards sustainable and long-term goals.

Figure 9 - ABFE Map panel for Holly Beach, LA

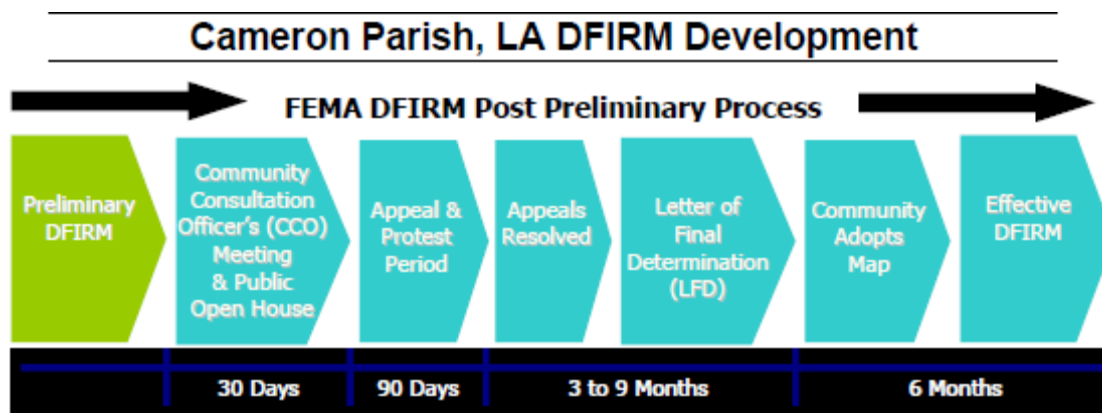


	<p>HURRICANE RITA SURGE INUNDATION and ADVISORY BASE FLOOD ELEVATION MAP Cameron Parish, Louisiana Date of Event: September 24, 2005 Date of Map: March 9, 2006 Map Number: LA-W15</p>	<p>Advisory Base Flood Elevations¹</p> <p>This map shows Advisory Base Flood Elevations (ABFEs) developed by FEMA. Please see http://www.fema.gov/hazards/floods/recoverydata/pdf/cameron_parrish11-30-05rh.pdf for more information on how they were determined.</p> <p>Estimated Rita Surge Elevations^{1,2}</p> <p style="text-align: center;">10-12 ft</p>														
<p>OVERVIEW MAP</p>  <p>Data Sources: Aerial Imagery: USDA, National Agriculture Imagery Program, 2004 Flood Zones and Elevations: FEMA Flood Insurance Rate Maps (Cameron Parish, 1991-1992) High Water Marks: FEMA (identified and surveyed Sept-Dec, 2005)</p>	<p style="text-align: center;">N</p>  <p style="text-align: center;">Feet</p>	<p>LEGEND</p> <table border="0"> <tr> <td> State Boundary</td> <td> Parish Boundary</td> </tr> <tr> <td colspan="2">Flood Advisory Related Data</td> </tr> <tr> <td> Advisory Base Flood Elevation (ABFE) Zone, including Flood Zone Type (AE or VE), and elevation (in feet)³</td> <td> Hurricane Rita Related Data</td> </tr> <tr> <td> Landward Limit of ABFEs⁴</td> <td> Preliminary Indoor High Water Mark^{1,2}</td> </tr> <tr> <td></td> <td> Preliminary Outdoor High Water Mark^{1,2}</td> </tr> <tr> <td></td> <td> Preliminary Debris High Water Mark^{1,2}</td> </tr> <tr> <td></td> <td> Limit of Rita Surge Inundation</td> </tr> </table> <p>Notes: ¹ Measured in feet relative to the National Geodetic Vertical Datum of 1929 (NGVD29). To convert from NGVD29 to North American Vertical Datum of 1988 in Cameron Parish, add 0.07 feet. ² Range estimated from surveyed, surge only High Water Marks. Local wave effects (wave heights and wave surge) are not included in these elevations. ³ Each individual ABFE shown applies to all properties located in the mapped zone, with zone boundaries outlined in yellow. These ABFEs reflect floodward of 1 foot above current effective Base Flood Elevations (BFEs) shown on each community's Flood Insurance Rate Map (FIRM). ⁴ For areas outside of the ABFE limits, please refer to the community's effective FIRM for additional flood hazard information, where applicable.</p>	State Boundary	Parish Boundary	Flood Advisory Related Data		Advisory Base Flood Elevation (ABFE) Zone, including Flood Zone Type (AE or VE), and elevation (in feet) ³	Hurricane Rita Related Data	Landward Limit of ABFEs ⁴	Preliminary Indoor High Water Mark ^{1,2}		Preliminary Outdoor High Water Mark ^{1,2}		Preliminary Debris High Water Mark ^{1,2}		Limit of Rita Surge Inundation
State Boundary	Parish Boundary															
Flood Advisory Related Data																
Advisory Base Flood Elevation (ABFE) Zone, including Flood Zone Type (AE or VE), and elevation (in feet) ³	Hurricane Rita Related Data															
Landward Limit of ABFEs ⁴	Preliminary Indoor High Water Mark ^{1,2}															
	Preliminary Outdoor High Water Mark ^{1,2}															
	Preliminary Debris High Water Mark ^{1,2}															
	Limit of Rita Surge Inundation															
<p>For more information on these advisory maps, please see http://www.fema.gov/hazards/floods/recoverydata/rita_index.shtml</p> <p>MAPS FOR ADVISORY PURPOSES ONLY - NOT FOR INSURANCE RATING PURPOSES</p> <p>For insurance rating purposes, refer to the currently effective Flood Insurance Rate Map (FIRM), available from your local government or the FEMA Map Service Center (1-800-368-6161) or http://msc.fema.gov/</p>																

The release of preliminary DFIRMs

Preliminary DFIRMs introduce the base flood elevation changes and Flood Insurance Studies (FIS) findings to a community for eventual adoption so that DFIRM document will be legally binding and guide floodplain management. There is a comment period when the preliminary DFIRMs are first released to a community so that they can be appealed by anyone in the community based on “demonstration that the BFEs proposed by FEMA are scientifically and/or technically incorrect” (FEMA LA Recovery Guide, p. 2). Following the release of preliminary DFIRMs, community officials have 30 days to review the maps and reports followed by meetings with the general public which lasts 90 days (FEMA LA Recovery Guide, p. 2).

Figure 10 –DFIRM development as was anticipated at release



Source: LaMapping Project

Ideally, should no one dispute the findings of the preliminary DFIRMS, the maps are given a date they will become effective and adopted officially by the community. The effective date given to a DFIRM is when the existing FIRMs become “historical” and are no longer the legal document, and the preliminary DFIRMs become the legal

document and the map to abide by for floodplain management and insurance rates. Only when the maps are adopted do communities need to adhere to them.

Table 2 - Timeline for Cameron Parish preliminary DFIRM adoption

Time scale for Cameron Parish Preliminary DFIRMs to be adopted by community	
Preliminary DFIRM and FIS delivery	03/28/2008
90 Day Community Appeal Start Date	12/18/2008
90 Day Community Appeal End Date	03/19/2009
Letter of Final Determination Date	To Be Determined
Study Effective Date	To Be Determined

The LRA appeal the preliminary DFIRMs for Cameron Parish

The agency that took the lead and opposed the preliminary DFIRMs for Cameron Parish was the Louisiana Recovery Authority (LRA). The LRA was instrumental in making FEMA aware that they felt the DFIRMs were not acceptable and requested that FEMA post-pone the delivery of the DFIRMs to Cameron Parish. The LRA felt strongly that the DFIRMs were far inferior to the ABFE maps and brought it to the attention of FEMA shortly after the preliminary DFIRMs were released in the Public Open House.

Figure 11 – Close up of Cameron Parish ABFE data showing Holly Beach

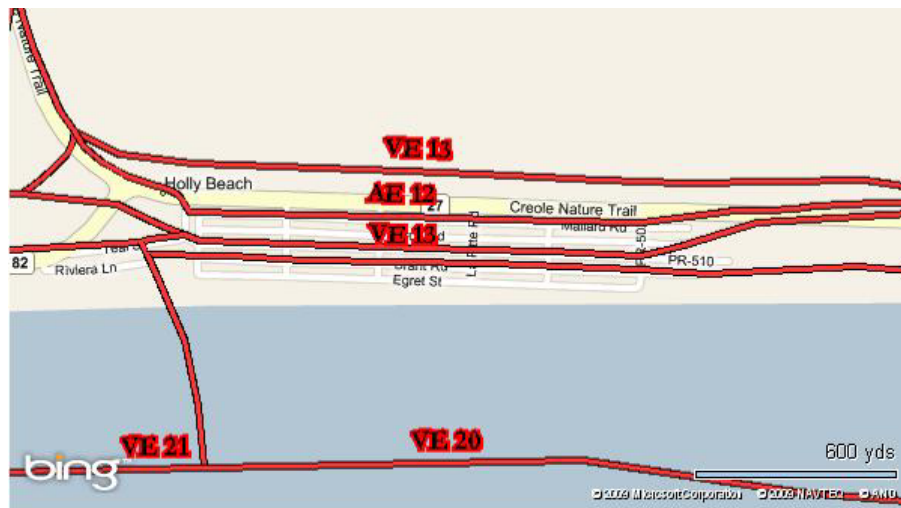
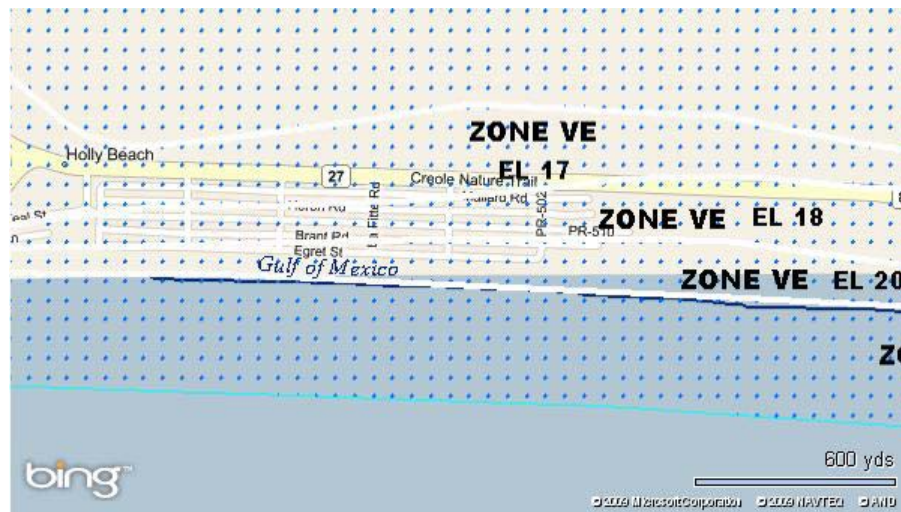


Figure 12 - Cameron Parish Preliminary DFIRM data showing Holly Beach, LA



Disputing the technical and scientific data in the preliminary DFIRMs

The LRA stood strongly behind flawed data as the reason there was the large discrepancy between the ABFE maps and the DFIRMs. After protesting the preliminary DFIRMs to FEMA, they consulted many field professionals to further investigate the validity of the data used by the DFIRMs. Per the LRA and the professional consultant

findings, the ABFEs are preferred because of claims that the DFIRMs do not represent the best available data and that the LRA uncovered flawed data in the new maps (Rainwater, Graves, and Cooper, 2008). The results over the legitimacy of the maps, though based on technical and scientific findings, have the possibility of affecting many lives. As such, Cameron Parish and the LRA did not feel as though their current efforts and investment in the restoration were being properly addressed and handled by FEMA. Paul W. Rainwater, Executive Director of the LRA, disputed FEMA's new ruling by stating that FEMA was "using the preliminary DFIRMs to deny temporary housing units to much of Cameron Parish" (Stevens, 2008). He further argued that "when people are living in tents to be close to their jobs, does it really matter if they live in an 'A' flood zone or a 'V' flood zone? What matters is that they need housing" (Stevens).

The LRA stated in a letter to Stark of FEMA reasons they found the DFIRMs to be inferior to the ABFE maps. They consulted professional engineers, the Coastal Protection and Restoration Agency, and Louisiana State University experts who all contributed to the conclusion that "significant problems appear to exist with the preliminary DFIRMs in terms of the data, modeling methodology, and with the models themselves," (Rainwater, Graves, and Cooper). The identified errors involved Wave Height Analysis for Flood Insurance Study (WHAFIS) errors, Advanced Circulation Model (ADCIRC) errors, and topographic errors involving LIDAR. The firm Lonnie G. Harper & Associates, Inc. presented to FEMA their findings which resulted in the following problems associated with the maps (Lonnie G. Harper & Associates, Inc.):

- Low resolution of topographic data in all models

- Poor calibration of surge model
- Improper application of input data
- Inconsistent elevation data between models
- Omission of input data
- Use of regional surge model for a small geographic area with unusual topographic features may yield questionable results

Jones also mentions that FEMA modeling did not take into account the chenier ridges that form higher ground located along the coastline, and this omission in data influences the flaws in the modeling that Cameron Parish and Louisiana are disputing in the preliminary DFIRM mapping. A chenier plain is a complex system of “strand-line ridges” made up of sand and shell material that roughly parallel one another and are separated from each other by mudflats. The name “chenier” came from the French word chene meaning oak as substantial oak tree populations line the ridges (Kaczorowski, p. 1). The development of the chenier plain spanned thousands of years and resulted from sediments of river deposits from the Mississippi River’s east to west long shore drift as it emptied into the Gulf of Mexico. Alternating reversals in the Mississippi flow during the past 3000 years has resulted in the repetitive accumulation of chenier ridges and mud flat sequences developed from years of shoreline growth and retreat (Coast 2050; Kaczorowski, p.1). Chenier ridges can range from a few feet to ten feet above sea level, and according to Jones, the ridges are the higher ground where people live.

ABFE grace period: a temporary solution

As a result of the LRA and Cameron Parish’s concerns with the preliminary DFIRMs, FEMA allowed a suspension of the release of the maps for a temporary period (Temporary housing units approved for the parish, 2009):

Governor Bobby Jindal announced that FEMA approved his request to allow Cameron Parish residents temporary housing units in areas designated as 'V-Zones' by preliminary Digital Flood Insurance Rating Maps (DFIRMs) the state believes are flawed. At the request of Governor Jindal, FEMA Administrator R. David Paulison will return to the practice of using Advisory Base Flood Elevations (ABFEs), rather than preliminary DFIRMs, to determine placement of park model temporary housing units in Cameron Parish only until the start of the next hurricane season, June 1, 2009.

During an LRA Board of Directors Meeting on February 26, 2009, it was stated in the minutes that Paul Rainwater, Executive Director of the LRA, spoke with FEMA about the LRA's opposition to the preliminary DFIRMs, but that FEMA was not being flexible with Louisiana. It states that he also expressed opposition to the timeframe for the DFIRMs, and that there [were] presently \$258 million in projects that are being de-obligated due to the preliminary DFIRMs (p. 6). The LRA and the Coastal Protection and Restoration Authority (CPRA) formed a subcommittee on the issue of FEMA's preliminary DFIRMs. The subcommittee, called the DFIRM Committee, is focusing on continuing to gather statewide support for the revision of the preliminary DFIRMs, discuss the preparation of a transition plan for adoption of more accurate DFIRMs, and continue discussion with FEMA over the inaccuracy of the DFIRMs.

Chapter 5: How effective is FEMA to aid Cameron Parish?

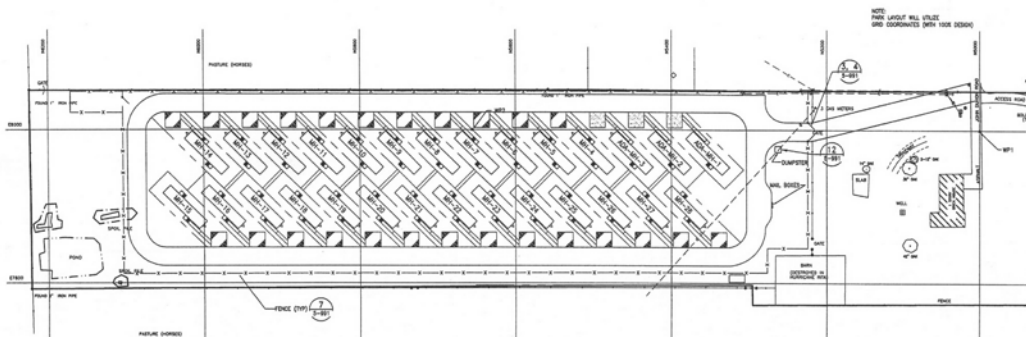
Temporary housing issues facing parish residents

When not relying on the census to track how many residential units are in the parish, counting the electric meters is a standard by which data is based according to Jones. To gauge just how much of the population has been lost because of the inability to rebuild, Jones relayed that there were 4900 electric meters counted before Hurricane Rita, 2900 electric meters counted after Hurricane Rita but before Hurricane Ike (2008), and 1300 electric meters after Hurricane Ike. Jones expressed that coverage for rebuilding was not enough with compensation from those who had insurance and the Road Home program².

FEMA's refusal to provide temporary housing in high risk coastal velocity flood zones made population retention in the region difficult. FEMA did attempt to find high and dry ground to set up temporary housing such as the 8-acre "Frederick LaBove Property" for 30 mobile homes in the Sweet Lake Community in Cameron Parish. Rental housing was already at a shortage in Cameron Parish, and emergency trailer parks were suggested as a means to house the homeless.

² The Road Home Program is the largest single housing recovery program ever in the U.S. designed to provide compensation to Louisiana homeowners affected by Hurricanes Katrina or Rita for the damage to their homes (<http://doa.louisiana.gov/cdbg/DRHousing.htm>)

Figure 13 - Frederick LaBove Property Temporary Housing Site



DFIRMs and their usefulness in recovery and planning

Flood insurance managed by the federal government has been debated, but the programs usefulness has never been thoroughly evaluated (Mileti, p. 14). Part of the problem is the idea that the maps do not actually represent risk. The idea of "high-risk versus not high-risk" is not a fair characterization of the problems associated with locating in a flood zone or along a coastal area, according to Robert Gilbert, professor of civil engineering at the University of Texas. Gilbert further questions the 'magic line' demarcating whether or not you will lose your home to a flood as indicated by flood zones on a flood map. He states that it seems to send the wrong message that the flood zone alone can indicate either a 1/100 chance you will lose your home in your life time or a 1/100 chance you will keep your home due to its location in or out of a floodplain. That idea is further compounded by the map revisions causing floodplain boundaries to change on a flood map which indicates that the risk has changed. The FIRMs are only “statistical representations of flood events and must be updated as additional data becomes available and models are refined” and unfortunately, much of the public trusts

the floodplain boundaries to be the extent of the flood risks when they are only as reliable as to show past occurrences of flooding where data is collected (Emmer et al, 15-16).

Gilbert believes what should be done is that we make knowledgeable decisions regarding where we locate, and that means better communication and outreach from planners and professionals explaining the risks involved to those who want to live in high risk areas. As an engineer, Gilbert would like to see people be able to make knowledgeable decisions about where they live, and to be able to live where they'd like so that the outcome after a storm is not as catastrophic. This could include awareness that purchasing flood insurance is highly advised in high risk areas to make the insured less dependent on federal aid to recoup their property losses.

Ambiguity in FEMA policy relating to coastal velocity zones

In addition to the data in the DFIRMs being accused of as inaccurate, in a memorandum addressed to Craig Fugate, the Administrator of FEMA, from Richard L. Skinner, Inspector General with the Office of Inspector General, fault was found on FEMA in regards to interpreting and enforcing FEMA's own regulations regarding public assistance and hazard mitigation projects located in V-zones. The result was that FEMA staff approved and obligated funds for ineligible projects based on their misunderstanding of the Executive Order 11988 (Skinner, 2009). FEMA staff's misunderstanding of Executive Order 11988 regarding the approval of substantial improvement projects for funding even though that is not supported by the language of the regulation, initiated a need for an investigation into the efficiency of Executive Order 11988 and also an

examine as to why rehabilitation is supported by the regulation but new construction is not (Skinner, 2009).

The misunderstanding by FEMA staff makes it difficult to ensure that Cameron Parish will be receiving the best in floodplain management through federal floodplain management policy when there are findings that even the staff of FEMA can misinterpret the regulation in regards to funding in V-zones. This damages the already shaky trust that residents have in the ability of the federal agency in charge of national emergency response to be making sound decisions regarding where they justify spending federal funds.

Chapter 6: Recommendations and final thoughts

There are many planning issues that contribute to deciding how a community reacts to natural disasters and flooding as well as how they are allowed to rebuild. The extreme situation facing Cameron Parish is compounded by its historical lack of planning, the state's lack of leadership in the realm of planning, and the federal government's recent adversarial adjustment to its funding projects in V-zones. The future of Cameron Parish rests in the hands of federal, state, and local policy, but the immediate desire to rebuild is only possible at this moment through the use of the federal funds. Two recommended options to help Cameron Parish plan for a sustainable future in lieu of a decision regarding the DFIRMs are as follows.

Participation in the NFIP's Community Rating System Program

Cameron Parish should opt into participating in the NFIP's Community Rating Systems (CRS) program. The CRS supports incentives and is a free and voluntary program that encourages floodplain management activities to exceed the minimum standards required for participation in the NFIP. It was implemented in 1990 and codified under the National Flood Insurance Reform Act of 1994. Communities that participate in the NFIP program must adhere to the minimum standards required for compliance, but most communities accept only the minimum requirements as the extent of their floodplain management duties. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management (FEMA). To plan

for a sustainable future, communities should increase their own requirements beyond what is expected just to qualify for the NFIP program.

Though the NFIP is not a “land use directive” it does try to encourage the wise use of floodplains at the local level to minimize damages and loss (Emmer et al, 14). The CRS program awards points to communities provided they participate in activities that include public outreach programs, open space preservation standards, acquisition and relocation options, and levee and dam safety preparedness activities. These points then add up to qualify a community for differing levels of reduced insurance premiums.

The program is considered one that benefits both the community and homeowner. Once a community adopts activities that promote awareness and encourage sounder building practices, the community increases their chance to better withstand flooding and hazards and will result in fewer insurance claims and displaced people. The property owners benefit by receiving lowered premiums based on the different types of activities the community chooses to participate in as well as providing personal protection for their homes. Another positive aspect of the program is that it contributes to the knowledge base of its residents regarding risks and influences better informed decisions over land-use. Arnold, Missouri, a community prone to floods from the Mississippi River, actively participated in FEMA’s now defunct Section 1362 acquisition program which was a limited buyout program (APA, p. 222). As one of the few communities to participate in Section 1362 in the early 1980s, the community acquired repeatedly flooded properties that were in a floodway and removed or demolished them, ultimately substantially reducing the loss that could have been exacerbated when the 1993 Mississippi floods ran

through parts of Arnold (APA, p. 222). By participating in proactive planning, a community makes itself less vulnerable to future floods and loss of infrastructure and possibly loss of life.

Community relocation

Another option for Cameron Parish is to relocate communities most at risk. Parish residents are very resistant to moving away from their communities, but the inherent attitude to rebuild in the same place where they lost their property to hurricanes because of social and cultural history can actually contribute to the parish population becoming sparse. Parish residents can fair better if they accept and adapt to the risks associated with coastal development. It has been proposed that:

Cultures can endure if the people survive, as has been well illustrated by the Acadians of coastal Louisiana. Repeated disruption and destruction from events such as Katrina and Rita pose a greater threat of dispersing people and diluting culture than would an organized, purposeful, gradual relocation. Incentives to build in safer areas and in a safer way should be strongly considered (Emmer et al, p. 66).

The state's coastal comprehensive plan's answer to concern #4 regarding DFIRM V-zones mentioned earlier was that relocation should follow a transitional stage instead of immediately forcing relocation. This indicates the state is hard pressed to find alternatives for communities affected by the DFIRMs because of the more restrictive flood zones as they anticipate having to make the drastic change in location as a way to foster sustainability and resilience to future disasters. Gilbert White (1964) described the flood problem by stating, "Floods are 'acts of God', but flood losses are largely acts of man" (p. 2). Though relocation may not be a welcome change as convincing people to

move after repeated floods is never an easy feat, those “impacted will have to be convinced of the benefits and agree to change their lifestyle” to avoid repeated disasters (National Research Council, p. 90). The 1993 Mississippi floods resulted in FEMA having to relocate several towns to ensure there would not be another repeat loss due to another catastrophic flooding of the river. Those relocated towns were an example also of how “abandonment of some towns and industrial sites is more cost effective from a national perspective” as one adds up the cost of possibly rebuilding those towns several times over in the wake of catastrophes (National Research Council, p.133). Is it in the best interest of the community to continually aid in a rebuilding effort that is constantly in threat of being demolished? “Sustainable development is development that meets the needs of the present without compromising the needs of future generations” (National Research Council, p. 16). Creating sustainable communities in high risk areas requires planning that will guide development to be adaptable to change but also recognize how the threats of nature that are predictable and disastrous can be avoided if moved out of harm’s way.

If FEMA continues to support their preliminary DFIRMs, and federal aid in V or VE flood zones are de-obligated for reconstruction and new construction projects, those communities most affected by the increased flood zone classification will be hard-pressed to find other means to pay for their redevelopment. Relocation may be their only option. The 1988 Stafford Disaster Relief Act (P.L. 93-288) was created because Congress recognized that “disasters often disrupt the normal functioning of governments and communities, and adversely affect individuals and families with great severity” therefore

“special measures [are necessary]...to assist emergency services and the reconstruction and rehabilitation of devastated areas” (FEMA, 2007, p. 1). Pompe and Rinehart mention in their research paper, “Mitigating damage costs from hurricane strikes along the southeastern U.S. Coast: A role for insurance markets”, that a way to reform the NFIP program would be to support a property buyout program, such as the 1988 Stafford Act, to facilitate that reform (2008). The 1988 Stafford Act provides federal funds towards aiding state and local governments to “alleviate suffering and damage which result from...disasters” (FEMA, p. 1), and according to Pompe and Rinehart, the 1988 Stafford Act was utilized successfully following the floods in 1993 Mississippi flooding (2008). It can be suggested that the 1988 Stafford Act can apply towards buying out property that is deemed ineligible for federal aid under the new preliminary DFIRMs to allow compensation for those unable to qualify for disaster relief under the umbrella of the preliminary DFIRMs.

It is important to note how public perception can change the intended reasons for rezoning land-use to compensate for flooding. In New Orleans, an idea that was motivated by the opportunity to shrink the city’s footprint and to densify neighborhoods was presented that was supposed to rezone neighborhoods most at risk for flooding into open space and rebuild and relocate the residents elsewhere. Needless to say, it did not go over well with affected neighborhood residents. The targeted neighborhoods at most risk for flooding were mostly African American, and the suggested planning technique to return the floodplains back to open space that is supported by recent smart growth initiatives was interpreted instead as a racist move (Nelson et al, p. 29). When proposing

buyouts or massive rezoning of towns or neighborhoods from residential to open space, planners must consider public perception and always work closely with those being displaced.

Final thoughts on an ongoing debate

The planning options recommended for Cameron Parish are intended to provide residents with options for a more sustainable future given the likelihood another storm will hit. By joining the Community Rating System, Cameron Parish could take advantage of the incentives provided to lower insurance premiums as those communities take action to protect their property and lives. A better understanding of the consequences of coastal development as well as floodplains and wind damage sustained by homes along the shoreline should extend beyond the minimum requirements regarding building guidelines as set out by the NFIP. The local governing body may not wish to infringe upon property rights by restricting development, but it should still take a leadership role in promoting smarter land-use and development principles. The methods mapped out in the objectives of the Community Rating System can contribute to changing attitudes, and if the community leadership can encourage, even enforce, better land-use, home owners may encounter costlier initial development to build but also lower their chances of having to rebuild because they elevated higher or even removed themselves from the floodplain.

There are no guarantees that any amount of planning can save extremely vulnerable communities, though, such as Holly Beach, against hurricanes the size of Rita which was located at a storm's first place of landfall. Even in the case of Hurricane

Katrina and New Orleans with its extensive hurricane protection system, if the system was working at 100% top condition, it is still expected to have been able to prevent about two-thirds of the damage and deaths, not all of them (ASCE, p. 39). Jones mentioned that those having the hardest time during this process are the elderly. Having to elevate a house to such a height as to make the entry ramp for those who cannot easily walk up stairs wrap several times around a house seems ridiculous. How high, then, is too high when it comes to elevating? How many adjustments can be made to a buildings design in the name of smarter planning before the building itself becomes more trouble than it is worth? When you can not build a “compliant” enough building so that it is comfortable for the homeowner, relocation seems to be the only logical other choice unless the homeowner agrees to assume all risk.

As FEMA’s own definition of a V or VE flood zone relies on proximity to the coast, it almost seems all too obvious that the maps would be flawed in areas zoned high risk coastal flooding that are miles from any ocean or lake coastline such as is the case in the northwest corner of the parish. Broussard commented that the state and the parish paid a considerable amount of money to restudy the hydrological and hydraulic modeling used to make a flood model and to assist in determining flood patterns for the Cameron Parish preliminary DFIRMs. According to Broussard, their studies showed "glaring errors" and significant flaws in methodology that was used in the creation of the maps. He does not dispute that V-zones are "germane to waterfront and coastal areas," but the V-zones are not correctly indicating accurate flood risk in the northern part of the parish. As important as it is to make sure the best data available is being used, money

desperately needed for rebuilding and reconstruction was spent elsewhere. If the community wants to be less subservient to FEMA and federal regulations in the event of a disaster, it needs to invest heavily in spreading the education and risk awareness in locating along the coasts to its residents. A hurricane the size of Rita did not hit Cameron Parish until 50 years after Hurricane Audrey, and no one really knows when the next one will strike. Better outreach is the surest method to protecting life and property because “without an effective risk communication program, people will gradually forget about the risk” (ASCE, p. 76).

The recovery period is also one of the few times a community can make substantial changes to land-use pattern for future development. Funding for the recovery weighs heavily on the ability to get federal aid as reconstruction costs after a natural disaster are too expensive for any state budget. Since planning is not performed at a federal level, it is up to the state and local governments to guide their own growth and sustainability before the federal government feels pressured to develop rules to govern land-use behavior. It is uncertain how effective planning in the face of hurricanes can be given our inability to ever fully protect against Mother Nature. Given, though, the new long-range plans by the parish and the state's coastal wetland restoration project, there are future plans for Cameron Parish that intend to keep the parish communities as close to where they call home as possible.

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